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Title	日本産のCulicoides属segnis群(双翅目,ヌカカ科)の種について
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The *segnis* Group of *Culicoides* Latreille from Japan, with Description of a New Species (Diptera: Ceratopogonidae)

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Abstract: Japanese species of the *segnis* group of *Culicoides* Latreille were taxonomically studied. Females and males of a new species *Culicoides nukabirensis* Wada and hitherto unknown males of *C. crassipilosus* Tokunaga were described. The characteristics to differentiate three Japanese species were given.

In the genus *Culicoides* Latreille of Ceratopogonidae, Campbell and Pelham-Clinton (1960) recognized the *segnis* group, in which they placed three British species, *C. minutissimus* (Zetterstedt), *C. reconditus* Campbell and Pelham-Clinton and *C. segnis* Campbell and Pelham-Clinton. The recognition of this group was followed by Kremer (1965) and Orsazágh (1976) in their studies of continental European *Culicoides*. It is considered that *C. crassipilosus* Tokunaga and *C. omogensis* Arnaud are Japanese members of this group (Wada and Kitaoka, 1977). Vargas (1973) proposed subgenus *Wirthomyia* for this group with *C. segnis* as type, and also included two Nearctic species, *C. stilobezzoides* Foot and Pratt and *C. bottimeri* Wirth. The purpose of the present paper is to describe females and males of a new species and hitherto unknown males of *C. crassipilosus* and to give characteristics for differentiation of all three Japanese species in the *segnis* group.

The following measurements in the description were made with ocular micrometer on slide mounted specimens.

Antennal ratio (AR)=(Sum of lengths segments XI–XV)/(Sum of lengths segments III–X).

Proboscis length: from tip of labrum-epipharynx to tormae.

Head height: from tormae to interocular seta.

Proboscis/head ratio (P/H)=Proboscis length/Head height.

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Palpal ratio (PR)=Length segment III/Breadth segment III.

Wing length: from basal arculus to wing tip.

Costal length: from basal arculus to tip of costa.

Costal ratio (CR)=Costal length/Wing length.

Table 1. Certain quantitative characters of the female given by mean value (and range)

	Antennal ratio AR	Palpal ratio PR	No. scutellum hairs	Wing length (mm)	Costal ratio CR	No. macrotrichia on basal cell
C. crassipilosus (AMAMI-OSHIMA)[1]	1.42, n=16[4] (1.37−1.47)	2.90, n=15 (2.46−3.18)	16.4, n=5 (13−18)	1.19, n=18 (0.96−1.32)	0.66, n=18 (0.63−0.68)	11.6, n=18 (1−21)
C. crassipilosus (OKINO-SHIMA)[2]	1.30, n=16 (1.24−1.36)	2.66, n=18 (2.46−2.85)	13.8, n=8 (12−18)	1.21, n=16 (1.14−1.32)	0.67, n=16 (0.63−0.69)	2.3, n=18 (0− 8)
C. crassipilosus (MESHIMA)[3]	1.32, n=17 (1.26−1.35)	2.55, n=20 (2.27−2.83)	12.9, n=10 (12−16)	1.35, n=20 (1.27−1.44)	0.68, n=20 (0.66−0.70)	0.2, n=20 (0− 1)
C. omogensis	1.16,n=3 (1.15−1.16)	1.79, n=3 (1.72−1.88)	8.5, n=2 (8− 9)	1.15, n=5 (1.11−1.19)	0.61, n=5 (0.59−0.64)	0.0, n= 4 (0− 0)
C. nukabirensis, n. sp.	1.51, n=6 (1.44−1.67)	2.00, n=9 (1.80−2.19)	13.3, n=4 (12−14)	1.42, n=13 (1.27−1.62)	0.62, n=13 (0.60−0.65)	14.7, n=11 (9−20)

1), 2) and 3) Collected at Amami-Oshima Island, Chikuzen-Okinoshima Island and Meshima Island, respectively.

4) No. samples examined.

Fig. 1. A map showing the distribution of three species of the *segnis* group in Japan. C: *C. crassipilosus*; N: *C. nukabirensis*, n. sp.; O: *C. omogensis*.

All values are given by mean (and range with the number (n) of samples). Terminology of antennal sensory organs by Wirth and Navai (1978) is followed, and the internal sclerite in female abdomen is described by Arnaud (1956) and Campbell and Pelham-Clinton (1960). Certain quantitative characters of females of Japanese three species are given in Table 1.

The *segnis* group

WING: Uniformly pale, without markings.

FEMALE: Eyes separated. Distribution of sensilla coeloconica on antennal segments variable. Third palpal segment with a distinct sensory pit. Spermathecae, 2 developed and 1 rudimentary; with a ring and without internal sclerites in some species and without a ring and with internal sclerites in the others.

MALE GENITALIA: Ninth tergum with well-developed apicolateral processes, the margin between them nearly straight and without a median notch. Basistyle with stout, sclerotized ventral root. Parameres widely separated, apex blade-like, often with long fine subapical setae. Aedeagus also diagnostic; wide round basal arch and slender short distomedian process.

Culicoides crassipilosus Tokunaga

Fig. 2, 5A, B and 6

Culicoides crassipilosus Tokunaga, 1937, Tenthredo 1, 276-278 (female; Wakayama Pref.; fig. female wing, antenna, palpus).—Tokunaga, 1962 (in part), Pacific Insects 4, 203-204 (key; synonym *balius*).—McDonald, Bolinguit and Lu, 1973, J. Med. Ent. 19, 638 (female after Tokunaga, 1937).

Culicoides balius Arnaud, 1956, Microentomology 21, 96–97, Fig. 52 (female; Mie Pref. and Okinawa; fig. female wing, head, antenna, palpus, mouthparts, thorax, legs, hind tibial comb, hind claw, spermathecae).—Hubert and Wirth, 1961, Proc. Ent. Soc. Wash. 63, 236 (key to females of Okinawa).—Kitaoka and Suzuki, 1974 (Amami-Oshima Island; distribution, ecology).—Kitaoka, 1977, 187–189 (key to females of Nansei Islands).

Culicoides sp. (OKINOSHIMA), Wada and Kitaoka, 1977, 174 (list in *segnis* group).—Wada, 1977, 559 (Chikuzen-Okinoshima Island; distribution).

FEMALE: Length of wing 1.26 (0.96–1.44, n=54) mm.

Head.—Eyes bare, separated by about the diameter of an ommatidial facet (Fig. 2B). Antenna with flagellar segments in proportion (micron units) of 50:30:31:32:34:33:33:34:66:66:69:80:91; AR 1.34 (1.24–1.47, n=49); sensilla coeloconica present usually on III, VII-IX, and XI-XIV, and rarely on X (see Table 2 for their numbers), but

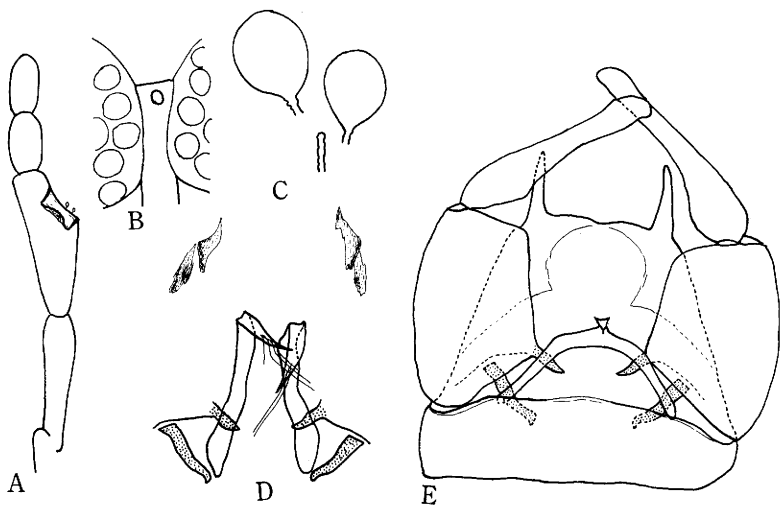

Fig. 2. *Culicoides crassipilosus* Tokunaga. A-C, Female: A, third palpal segment; B, eye separation; C, spermathecae, 2 developed, 1 rudimentary and a pair of internal sclerites. D, E, Male: D, parameres; E, genitalia, parameres removed.

Table 2. Mean number (and range) of sensilla coeloconica on antennal segments of females

	C. crassipilosus AMAMI[1], n=16[4]	*C. crassipilosus* OKINOSHIMA[2], n=16	*C. crassipilosus* MESHIMA[3], n=17	*C. omogensis* n=3	*C. nukabirensis*, n. sp. n=4
III	2.25(1−3)	2.50(2−4)	3.18(2−5)	6.00(5−7)	5.25(5−6)
IV	0	0	0	2.67(2−3)	3.25(3−4)
V	0	0	0	3.00(3−3)	3.25(3−4)
VI	0	0	0	2.67(2−3)	3.75(3−4)
VII	0.88(0−1)	0.56(0−1)	0.82(0−1)	2.33(2−3)	4.00(4−4)
VIII	0.69(0−1)	0.63(0−1)	0.35(0−1)	2.33(2−3)	4.00(4−4)
IX	0.81(0−1)	1.00(0−2)	1.00(1−1)	2.33(2−3)	4.25(4−5)
X	0.31(0−1)	0.25(0−1)	0	2.33(2−3)	4.00(4−4)
XI	1.06(1−2)	1.00(0−2)	0.88(0−2)	1.00(1−1)	0
XII	1.00(1−1)	0.75(0−1)	0.94(0−1)	1.00(1−1)	0
XIII	1.00(1−1)	0.94(0−1)	1.12(1−2)	1.00(1−1)	0
XIV	2.94(2−4)	2.56(1−4)	3.00(1−4)	1.33(1−2)	0
XV	0	0	0	4.33(4−5)	0
Total	10.94	10.19	11.29	32.32	31.75

1), 2), 3) Collected at Amami-Oshima Island, Chikuzen-Okinoshima Island and Meshima Island, respectively.

4). Number of antennae examined.

sometimes difficult to be seen due to a shallow pit with thin wall, from which only a few dark microtrichia are grown; several sensilla basiconica on XI-XV, sensilla trichodea 3-4 in number on III-X (2 large and 1-2 small) and many on XI-XV; number of sensilla chaetica ca. 9 on III, ca. 6 on IV-X, 1-2 on XI-XIV and ca. 6 on XV. Third palpal segment (Fig. 2A) 88 (66−99, n=53) microns long, moderately enlarged with a deep sensory pit, PR 2.69 (2.27−3.18, n=53). Proboscis 205 (184−224, n=28) microns long; P/H 0.89 (0.79−1.06, n=28). Mandible with 17.5 (14−20, n=44) teeth.

Thorax.—Mesonotum dark brown without prominent pattern. Scutellum with 14.0 (11−18, n=23) hairs. Legs brown, without white bands; hind tibial comb with 5.2 (5−7, n=54) bristles. Wing (Fig. 5A) uniformly pale brown, without markings; 1.26 (0.96−1.44, n=54) mm long, CR 0.67 (0.63−0.70, n=54); macrotrichia present over wing surface, but less dense on basal cell (Table 1), and absent on costal cell.

Abdomen.—Brown. Spermathecae (Fig. 2C, 6), 2 developed and 1 rudimentary, without ring, but with a pair of internal sclerites; size of developed spermathecae including neck approximately 58×40 and 48×34 microns; rudimentary one ca. 18 microns long. There are variations in the length of neck of developed spermathecae among females collected at different localities (Fig. 6); the mean length approximately 8 and 5 microns in the populations of Chikuzen-Okinoshima Island and Meshima Island, respectively, but practically without neck in the Amami-Oshima Island population.

MALE: Length of wing 1.15 (1.01−1.37, n=35) mm. General coloration as in female.

Head.—Eyes bare. Antenna with sensilla coeloconica on III and XIV, sensilla chaetica on III-X, XIII and XIV. Third palpal segment slender, with a small sensory pit.

Thorax.—Wing (Fig. 5B) uniformly pale brown; 1.15 (1.01−1.37, n=35) mm long; CR 0.62 (0.59−0.65, n=35); macrotrichia distributed on an apical half of wing, less dense than female.

Genitalia (Fig. 2D, E).—Ninth sternum without caudomedian excavation. Ninth tergum 155 (142−180, n=19) microns long excluding apicolateral process and 176 (160−198, n=19) microns wide at base; the distance between long apicolateral processes 71 (64−86, n=19) microns. Basistyle with stout, sclerotized ventral root. Parameres widely separated, club-like, tapering posteriorly, with 2.8 (2−5, n=33) fine, long hairs at apical portion. Aedeagus with basal limbs long, slender and curved; the median process very short.

DISTRIBUTION: Japan; Mie Prefecture, Wakayama Prefecture, Chikuzen-Okinoshima Island, Meshima Island (new distribution), Amami-Oshima Island and Okinawa Island (Fig. 1).

SPECIMENS EXAMINED:

Amami-Oshima Island.—2 females, 24 Oct. 1972, and 2 females, 30 Oct. 1972, H. Suzuki, light trap at hen-coop; 1 female, 3 Oct. 1973, and 1 female, 4 Oct. 1973, Y. Wada, light trap at hen-coop; 1 female, 15 Oct. 1973, light trap at cowshed; 6 females, 16 Nov. 1973, K. Kurokawa, light trap.

Meshima Island.—10 females, 10 males, 12 May 1978, Y. Wada, light trap.

Chikuzen-Okinoshima Island.—5 females, 3 males, 23 Jul. 1977, and 4 females, 6 males, 24, Jul. 1977, M. Mogi, light trap.

DISCUSSION: Arnaud (1956) described *C. balius*, based on a female from Mie Prefecture and a female from Okinawa Island. The specimens used in the present paper are generally in agreetment with *C. balius*. Tokunaga (1962) wrote "The only distinct difference (of *C. balius* from *C. crassipilosus*) is the arrangement of the antennal sensory tufts, but this is thought to be too slight to erect it as an independent species". However, as Tokunaga (1960) seems to have regarded a different species as *C. crassipilosus*, it is very likely that *C. crassipilosus* of Tokunaga (1962) is also different from true *C. crassipilosus* (see also discussion for *C. nukabirensis*, n. sp.). According to the original description of *C. crassipilosus*, "coloration very extensively yellow; thoracic tergum with three dark brown stripes and many dots at insertion of setae; ... A. R. 1.14". Arnaud (1956) stated that *C. balius* is a light brown species. The difference in general coloration may be due to the fact that the descriptiion of *C. crassipilosus* was based on a specimen preserved in alcohol, and *C. balius* was described with two females cleaed in KOH and mounted with balsam. In my experience, specimens become very pale when preserved in alcohol for a long time. The dark brown stripes on mesonotum of *C. crassipilosus* may be the color of thoracic muscles, which can be seen through the integument in alcohol. "Many dots at insertion of setae" on the mesonotum first reminded me of a group of dark microtrichia around the point of bristle insertion, as seen in *C. circumscriptus*. The phenol-balsam mounted specimens used for the present description do not have such dark dots on the mesonotum, but they are visible in dried specimens under stereoscope. AR 1.14 of *C. crassipilosus* is much smaller than 1.52 of *C. balius* given by Arnaud (1956). The specimens described in the above have intermediate value of AR between the two, mean 1.34, range 1.24−1.47. Thus, the above discussion is not conclusive, however in the situation that the type specimen of *C. crassipilosus* is not available now, I propose to consider *C. balius* as synonym of *C. crassipilosus*, until specimens that exactly coincide with *C. crassipilosus* are collected.

C. crassipilosus had been known from Wakayama Prefecture (type locality), Mie Prefecture and Okinawa Island (type localities of *C. balius*), and Amami-Oshima Island (as *C. balius* by Kitaoka and Suzuki, 1974). When I examined specimens collected at Chikuzen-Okinoshima Island, it was first thought that they were distinct from *C. crassipilosus* (or *C. balius*), and listed that species as *C.* sp. (OKINOSHIMA) in the

segnis group (Wada and Kitaoka, 1977). The most remarkable difference is that the neck of developed spermathecae is long (mean 8, range 5–10 microns, n=17) in the population of Chikuzen-Okinoshima (Fig. 6A, B), while in the figure by Arnaud (1956) as *C. balius* and in the specimens of *C. crassipilosus* collected at Amami-Oshima spermathecae practically have no neck part (Fig. 6E). Also, the number of macrotrichia on the basal cell of wing is different; it is 2.3 (0–8, n=18) in the Chikuzen-Okinoshima population and 11.6 (1–21, n=18) in *C. crassipilosus* of Amami-Oshima (19 in the figure of wing by Arnaud, 1956). However, the females collected later at Meshima-Island produced the problem in differentiating clearly these two populations. The Meshima females have the intermediate length, between the Amami-Oshima *C. crassipilosus* and the Chikuzen-Okinoshima population, of neck part of spermathecae, which is 5 (0–8, n=18) microns (Fig. 6C, D), but the number of macrotrichia on the basal cell is much smaller, 0.2 (0–1, n=20), than the two populations. In spite of these variations in females of the three populations, any difference in males can not be recognized between the Chikuzen-Okinoshima and the Meshima population (males have not yet been collected at Amami-Oshima). Therefore, all the three populations were tentatively regarded as *C. crassipilosus* in the present paper, but future studies on material collected further at various localities may reveal the inclusion of several species in this complex.

C. crassipilosus is confined to coastal areas and islands in the distribution. Kitaoka and Suzuki (1974) reported the ornithophilous feeding habit of this species.

Culicoides omogensis Arnaud

Fig. 3 and 5C

Culicoides omogensis Arnaud, 1956, Microentomology, 21, 119–120, Fig. 81 (female; Ehime Pref.; fig. female wing, head, antenna, palpus, mouthparts, thorax, legs, hind tibial comb, hind claw, spermathecae).—Kitaoka, 1963, Bull. Nat. Inst. Animal Hlth 46, 48 (Nagano Pref.; new distribution).—Cho and Chong, 1974, 68–69 (South Korea; new distribution).

FEMALE: Length of wing 1.15 (1.11–1.19, n=5) mm.

Head.—Eyes bare, separated by about half the diameter of an ommatidial facet (Fig. 3 B). Antenna with flagellar segments in proportion (micron units) of 43:30:30:30:29:30:29:29:48:48:53:58:85; AR 1.16 (1.15–1.16, n=3); sensilla coeloconica well-defined, present on all segments of III-XV (see Table 2 for their numbers); several

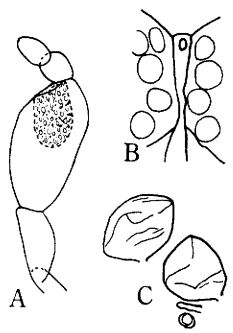

Fig. 3. *Culicoides omogensis* Arnaud. A–C, Female: A, third palpal segment; B, eye separation; C, spermathecae, 2 developed, 1 rudimentary and a ring.

sensilla basiconica on XI-XV; sensilla trichodea 3−4 in number on III-X (2 large and 1−2 small) and many on XI-XV; sensilla chaetica 5−6 in number on IV-X (present on III but the number not recorded), and a few on XI-XV. Third palpal segment (Fig. 3A) 77 (76−79, n=3) microns long, greatly enlarged with a very deep sensory pit, PR 1.79 (1.72−1.88, n=3). Proboscis 148 (143−153, n=2) microns long; P/H 0.77 (0.71−0.82, n=2). Mandible with 14.6 (13−17, n=5) teeth.

Thorax.—Mesonotum dark brown without prominent pattern. Scutellum with 8.5 (8−9, n=2) hairs. Legs brown, without white bands; hind tibial comb with 4.0 (4−4, n=3) bristles. Wing (Fig. 5C) uniformly pale brown, without markings; 1.15 (1.11−1.19, n=5) mm long; CR 0.61 (0.59−0.64, n=5); macrotrichia present over wing surface excepting basal and costal cells.

Abdomen.—Brown. Spermathecae (Fig. 3C), 2 developed and 1 rudimentary, with a ring, but without internal sclerites; developed spermathecae without neck part, approximately 46×33 and 43×33 microns in size; rudimentary one ca. 15 microns long.

MALE: Unknown.

DISTRIBUTION: Japan; Hokkaido (new distribution), Nagano Prefecture and Ehime Prefecture (Fig. 1). Kitaoka (1963) reported the occurrence of this species in the Far East of the Soviet Union after Gutsevich (1960). However, *C. omogensis* in the Far East was corrected to be *C. reconditus* by Gutsevich (1973). Cho and Chong (1974) recorded this species from South Korea. So, the known distribution of this species is Japan and South Korea.

SPECIMENS EXAMINED:

Utsukushigahara, Nagano Prefecture.—1 female, 6 Jul. 1961, S. Kitaoka; 1 female, 7 Jul. 1961, S. Kitaoka. Nukabira, Hokkaido.—1 female, 2 Jul. 1962, H. Ono.

DISCUSSION: Specimens examined are generally in agreement with Arnaud's (1956) original description, except for antennae. In the original description, AR approximately 0.94 and sensilla coeloconica absent on XI and XII, while in the present specimens AR 1.15−1.16 and sensilla coeloconica present on all the segments. These discrepancies may be due to the fact that the original description was based on a holotype female with partly collapsed antennae. Dr W. W. Wirth kindly re-examined the holotype for the present paper and found that sensilla are present on III-XV.

C. omogensis is a montane species. The biting habit is unknown.

Culicoides nukabirensis Wada, n. sp.

Fig.4 and 5D, E

Culicoides crassipilosus, (misidentification, not Tokunaga, 1937), Tokunaga, 1960, 71 and 73 (female, male; Nukabira, Hokkaido; fig. male genitalia).

Culicoides sp. (NUKABIRA No. 2), Wada and Kitaoka, 1977, 174 (list in *segnis* group).

FEMALE: Length of wing 1.42 (1.27−1.62, n=13) mm.

Head. — Eyes bare, separated by about half the diameter of an ommatidial facet (Fig. 4B). Antenna with flagellar segments in proportion (micron units) of 47:30:32:32:32:30:31:31:67:69:74:79:112; AR 1.51 (1.44−1.67, n=6); sensilla coeloconica well-defined, present on III-X (see Table 2 for their numbers); several sensilla basiconica on XI-XV; sensilla trichodea 3−4 in number on III-X (2 large and 1−2 small) and many on XI-XV; number of sensilla chaetica ca. 8 on III, 6−7 on IV-X and ca. 2 on XI-XV. Third palpal segment (Fig. 4A) 94 (86−104, n=9) microns long, greatly enlarged with a very deep sensory pit, PR 2.00 (1.80−2.19, n=9). Proboscis 156 (143−163, n=4) microns long; P/H 0.75 (0.74−0.76, n=4). Mandible with 14.0 (13−16, n=10) teeth.

Thorax. — Mesonotum dark brown without prominent pattern. Scutellum with 13.3 (12−14, n=4) hairs. Legs brown, without white bands; hind tibial comb with 5.1 (4−6, n=13) bristles. Wing (Fig. 5D) uniformly pale brown, without markings; 1.42 (1.27−1.62, n=13) mm long; CR 0.62 (0.60−0.65, n=13); macrotrichia present over wing surface, the number on basal cell 14.7 (9−20, n=11).

Abdomen. — Brown. Spermathecae (Fig. 4C), 2 developed and 1 rudimentary, without a ring, but with internal sclerites; size of developed spermathecae (short neck inclusive in length) approximately 70×46 and 54×38 microns; rudimentary one ca. 14 microns long.

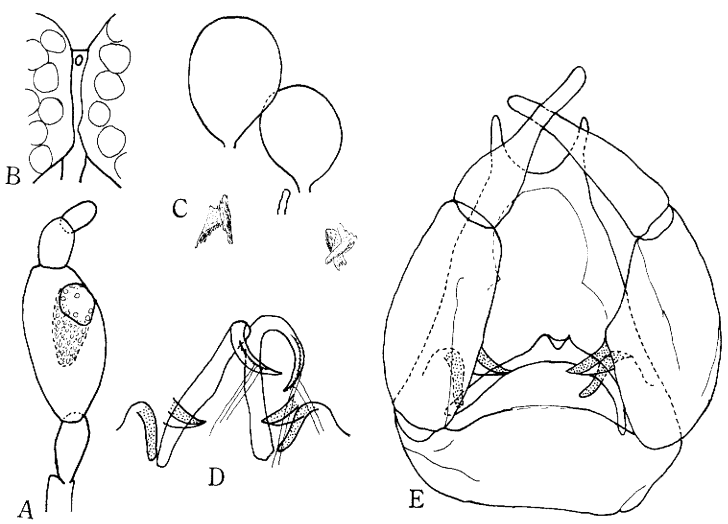

Fig. 4. *Culicoides nukabirensis* Wada, n. sp. A-C, Female: A, third palpal segment; B, eye separation; C, spermathecae, 2 developed, 1 rudimentary and a pair of internal sclerites. D,E, Male: D, parameres; E, genitalia, parameres removed.

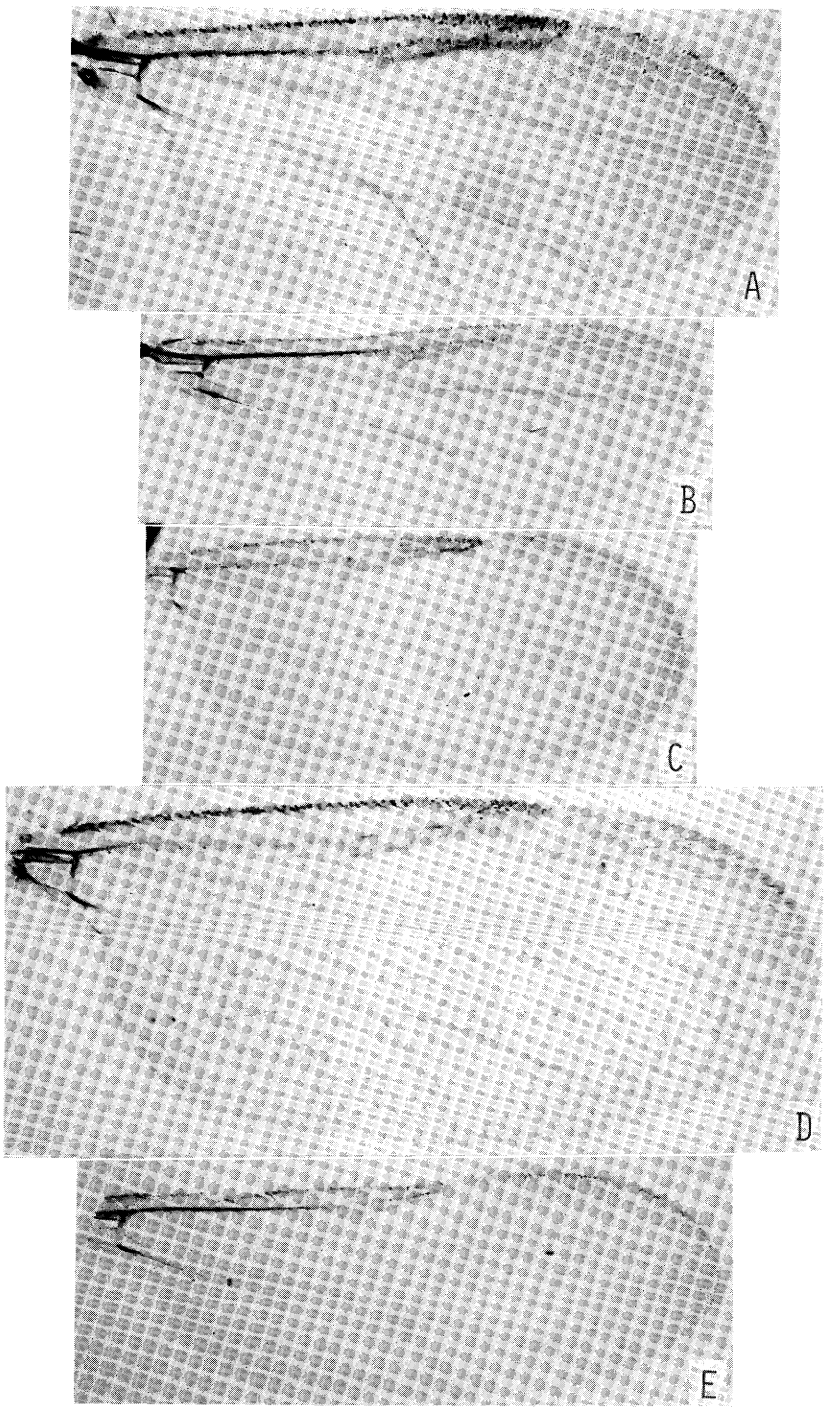

Fig. 5. Wings. A,B, *C. crassipilosus*: A, female; B, male. C, *C. omogensis*, female. D, E, *C. nukabirensis*, n. sp.: D, female; E, male.

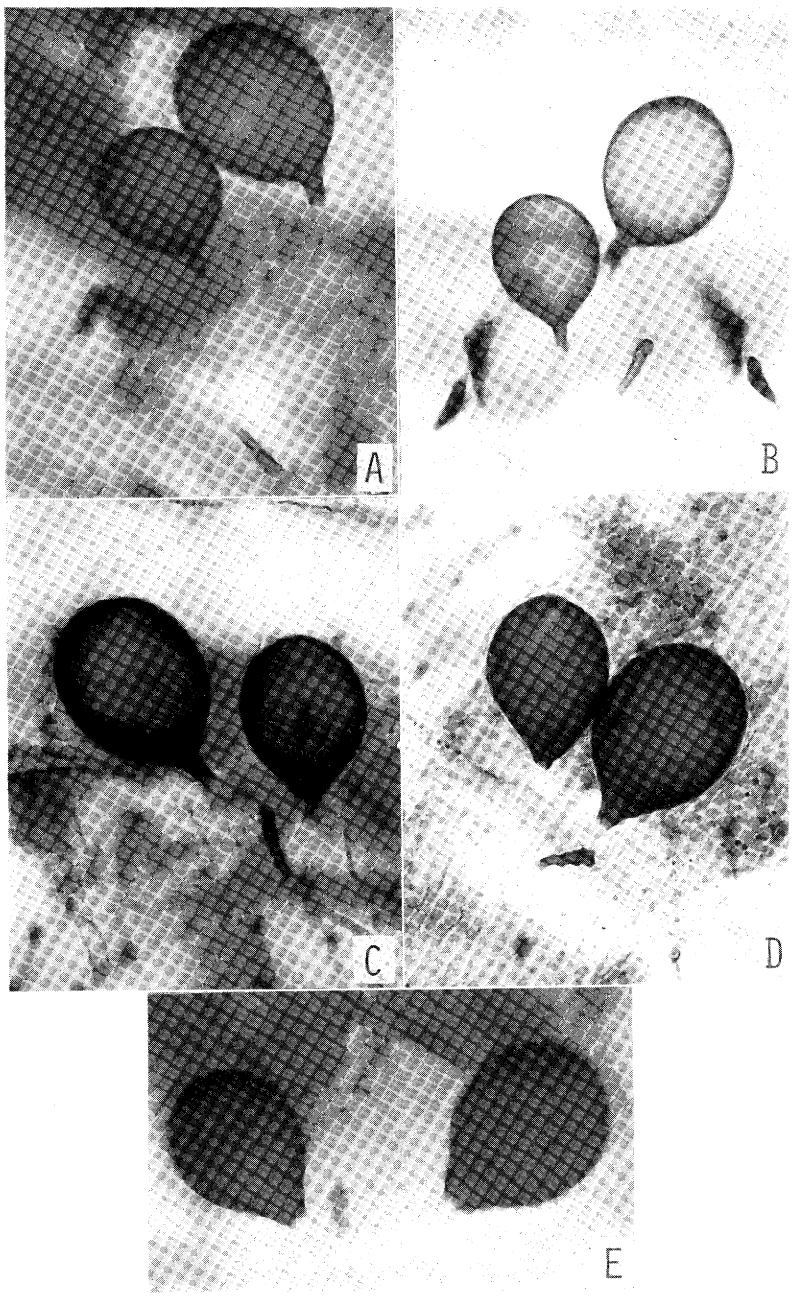

Fig. 6. Spermathecae of *Culicoides crassipilosus* female.
A,B, collected at Chikuzen-Okinoshima Island; C, D, collected at Meshima Island; E, collected at Amami-Oshima Island. The neck part of developed spermathecae is long in A–C, and short in D, E. Note that both long and short necks are found in females at Meshima Island (C and D).

MALE: Length of wing 1.25 (1.09−1.34, n=11) mm. General coloration as in female.

Head.— Eyes bare. Antenna with sensilla coeloconica on III and VII-XII, sensilla chaetica on III-XIV. Third palpal segment not much swollen, with a small sensory pit.

Thorax. — Wing (Fig. 5E) uniformly pale brown, 1.25 (1.09−1.34, n=11) mm long; CR 0.56 (0.54−0.58, n=11); macrotrichia distributed on an apical half of wing, less dense than female.

Genitalia (Fig. 4D, E).— Ninth sternum without caudomedian excavation. Ninth tergum 176 (160−191, n=6) microns long excluding apicolateral process and 160 (152−170, n=6) microns wide at base; the distance between long apicolateral processes 56 (51−66, n=6) microns. Basistyle with stout, sclerotized ventral root. Parameres widely separated, club-like, tapering posteriorly, with 3.6 (3−4, n=7) fine, long hairs at apical portion. Aedeagus with basal limbs long, slender and curved; the median process very short.

DISTRIBUTION: Japan; Hokkaido and Nagano Prefecture (Fig. 1).

TYPES: *Holotype*, female, Nukabira, 2 Jul. 1962, H. Ono; *Allotype*, male, the same data as Holotype; *Paratypes*, 1 female and 2 males, the same data as Holotype. Holotype and Allotype are deposited in National Science Museum, Tokyo, Japan and 1 female Paratype and 1 male Paratype in U. S. National Museum, Washington, D. C.

OTHER SPECIMENS EXAMINED : Nukabira, Hokkaido. — 1 female, 5 Jul. 1959, H. Ono; 1 female and 2 males, 12 Jul. 1959, H. Ono; 1 female, 5 Aug. 1960, H. Ono; 2 females, 10 Aug. 1960, H. Ono; 1 male, 20 Aug. 1962.

Utsukushigahara, Nagano Prefecture. — 2 females, 6 Jul. 1961, S. Kitaoka.

DISCUSSION: *C. crassipilosus* was described as a new species by Tokunaga(1937)based on female collected at Wakayama Prefecture. In 1960, Tokunaga gave characters of both sexes of a species collected at Nukabira, Hokkaido as *C. crassipilosus*. However, I recently had a chance to examine the specimens of both sexes (deposited at Kyoto Prefectural University, formerly Saikyo University) that were used for the description in Tokunaga (1960), and found that there is a great difference in palpus between the original description of *C. crassipilosus* by Tokunaga (1937) and the specimens of Tokunaga (1960). According to Tokunaga (1937), the female of *C. crassipilosus* has slender third palpal segment with a sensory pit, from which long spoon-like sensilla are grown, while in the females of Tokunaga (1960) third palpal segment is conspicuously swollen and sensilla are confined within a sensory pit. Therefore, I considered the species of Tokunaga (1960) to be distinct from *C. crassipilosus*, and described it as a new species under the name of *C. nukabirensis* Wada.

There is a possibility that males described in the above do not belong to *C. nukabirensis*, n. sp., but *C. omogensis*, because 3 males were collected on 2 July 1962 at Nukabira, together with 2 females of the former species and 1 female of the latter. However, the absence of sensilla coeloconica on any of the apical three segments XIII–XV in the above-described males suggests that they are *C. nukabirensis*, n. sp. rather than *C. omogensis*, in view of the distribution of sensilla coeloconica in female antennae.

Females of the present new species can easily be separated from *C. omogensis* by absence of sensilla coeloconica on antennal segments XI–XV and presence of internal sclerites and absence of a ring in the abdomen, and from *C. crassipilosus* by absence of sensilla coeloconica on XI–XIV and greatly enlarged third palpal segment. Male genitalia of *C. nukabirensis*, n. sp. is clearly different from *C. crassipilosus* in the shape of the ninth tergum.

C. nukabirensis, n. sp. is closely related to 3 European species, *C. reconditus* Campbell and Pelham-Clinton, *C. riouxi* Kremer and *C. segnis* Campbell and Pelham-Clinton, in that the female has the greatly enlarged third palpal segment and a pair of internal sclerites in the abdomen, and in the male the median process of aedeagus is extremely short. However, the present new species can be differentiated by larger antennal ratio of 1.51, range 1.44–1.67 (1.10, range 1.07–1.15 in *C. reconditus* and 1.13, range 1.10–1.15 in *C. segnis* after Campbell and Pelham-Clinton, 1960, and 1.09, range 1.09–1.10 in *C. riouxi* after Kremer, 1965) in the female, and ninth sternum without caudomedian excavation in the male.

C. nukabirensis, n. sp. is apparently a montane species. The biting habit is unknown.

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日本産の *Culicoides* 属 *segnis* 群（双翅目，ヌカカ科）の種について

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日本産の *Culicoides* 属 *segnis* 群のヌカカを分類学的に検討し，1新種 *Culicoides nukabirensis* を記載した．また，これまで未知であった *C. crassipilosus* の雄を記載し，あわせて日本産の合計3種を区別する特徴を述べた．

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